SECTION 2.3.6

BIG RIVER WATERSHED

Based on the recognition that the anadromous fishery is in decline, activities to assess the watershed and improve conditions for anadromous salmonids are underway. A Clean Water Act Section 303(d) TMDL waste reduction strategy for sediment has been completed in draft and awaits approval by USEPA. The following provides an overview of activities and outlines our basic framework and strategy at this time.

WATERSHED DESCRIPTION

The Big River watershed drains an area of approximately 116,000 acres, or about 181 square miles. The Big River estuary is located immediately south of the town of Mendocino and approximately ten miles south of Fort Bragg. The watershed drains from the east to the west, sharing ridges with the Noyo River watershed to the north, the Eel River watershed to the east, and the Little, Albion and Navarro River watersheds to the south. The Big River watershed has a Mediterranean climate, characterized by a pattern of low-intensity rainfall in the winter and cool, dry summers with coastal fog. Mean annual precipitation is 40 inches at Fort Bragg near the western margin of the watershed and 51 inches at Willits to the east. About 90% of the precipitation in this area falls between October and April with the highest average precipitation in January. Snowfall is very rare and hydrologically insignificant.

The Big River Basin is sparsely populated, with most of the land used for silviculture and other smaller areas used for ranching. There are only a handful of populated areas within the Big River Basin, including the areas around Orrs Springs, Whiskey Springs, Cameron, and Mendocino. By far the largest populated area is Mendocino, with a population of approximately 824 people.

The Big River, like the other coastal watersheds in Mendocino County, is in the Oregonian Biotic Province, which includes the moist, cool strip from Vancouver, Canada south to San Francisco Bay. Vegetation in the Big River basin is predominantly coniferous with redwoods near the coast and in the stream bottoms and Douglas fir in the interior and along the ridges. Broadleaf trees typical of the area include tan oak, live oak, alder, bay and madrone. They are interspersed throughout the conifer stands. On the drier slopes in the headwaters there is considerable oak-grassland and brush. California black oak, Oregon oak, ceanothus, currant, raspberry, and manzanita comprise woody species dominant in these areas. Herbaceous species consist of oat grasses, bromes, fescues, and filagree.

Of particular note in the Big River watershed are the brackish and freshwater bogs, the extensive estuary, and the freshwater marshes. There are eight freshwater marshes within the first seven miles of the estuary valley. Salt water extends up the Big River estuary approximately 8.3 miles in the summer and three miles during the winter. This is the largest estuary in the North Coast Region and the mouth of the river stays open all year. Plants common in the brackish and freshwater bogs include: sedge, yellow skunk cabbage, common spike rush, bulrush, water hemlock, willow herb, brooklime, and cattail. The estuary contains eelgrass, pondweed, water plantain, sedge, low club rush, and brass buttons. The marshes include sedge, cattail, yellow pond lily, water hemlock, yellow cress, pondweed, azolia, duckweed, and bladderwort.

Historically, coho and steelhead are thought to have occurred throughout the Big River watershed. All of the subwatersheds in the Big River watershed have accessible streams presumed to have been suitable for sustaining populations of salmonids under pre-management conditions. Compared to coho, currently steelhead are reported to be relatively more abundant

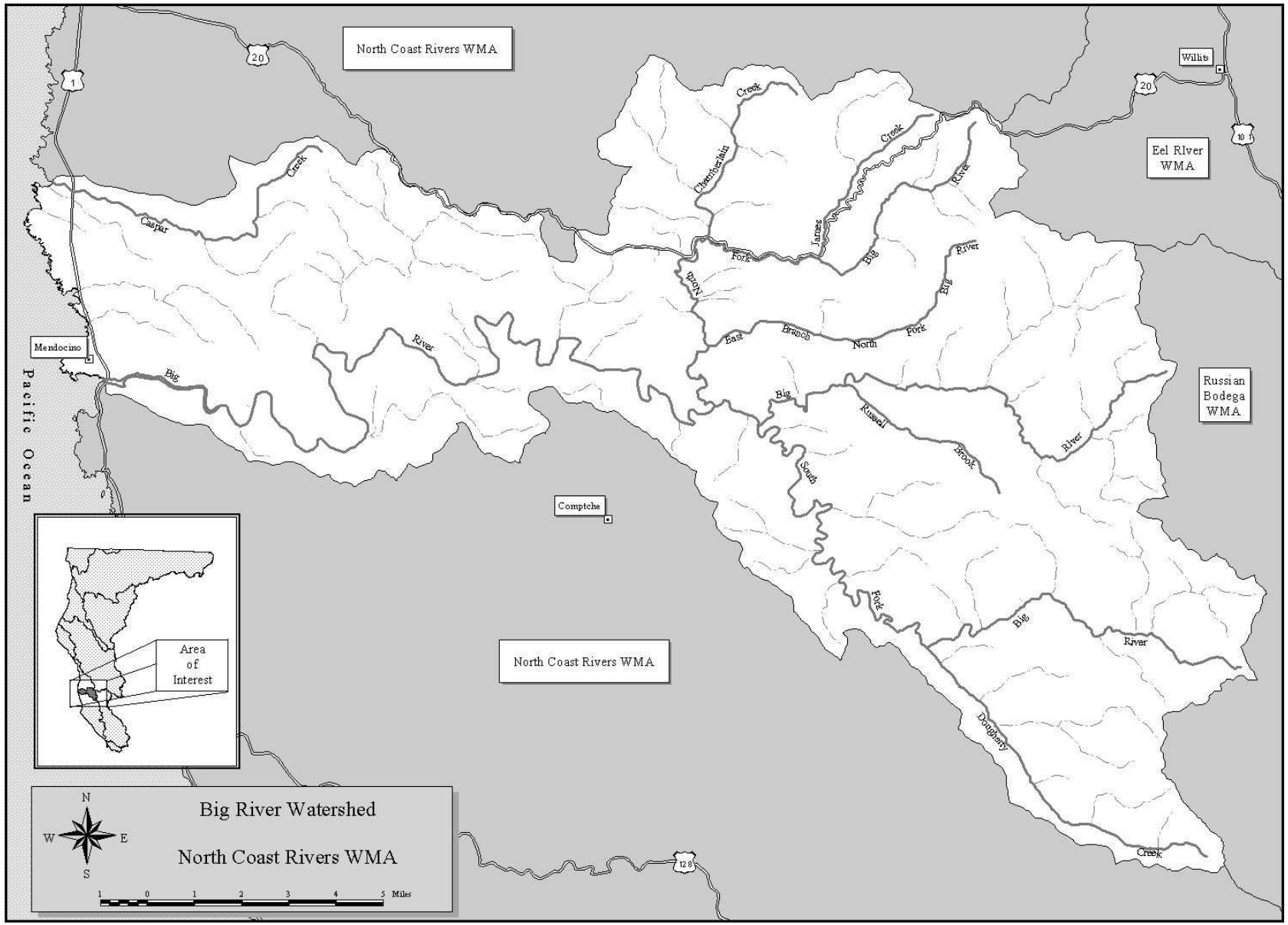

Figure 2.3.6.1. Big River Watershed

and more widespread in the Big River watershed, but the actual population numbers are low for both species, especially as compared to historic levels.

The primary beneficial use of concern in the Big River watershed is the cold freshwater fishery that supports coho salmon (*Oncorhynchus kisutch*) and steelhead trout (*O. mykiss*), both listed as threatened under the federal Endangered Species Act. The Basin Plan identifies municipal, industrial, agricultural, and recreational uses of the Big River watershed. The beneficial uses of water related to rare, threatened or endangered species has been proposed for this basin. As with many of the north coast watersheds, the cold water fishery appears to be the most sensitive of the beneficial uses in the watershed because of the sensitivity of salmonid species to habitat changes and water quality degradation. Accordingly, protection of these beneficial uses is presumed to protect any of the other beneficial uses that might also be harmed by sedimentation.

The following beneficial uses are related to the Big River watershed's cold water fishery:

- Commercial and sport fishing (COMM);
- Cold freshwater habitat(COLD);
- Migration of aquatic organisms(MIGR);
- Spawning, reproduction, and early development(SPWN); and,
- Estuarine habitat (EST).

The five largest property owners are private timber companies and a state-owned forest: together, Mendocino Redwood Company, Jaskson State Demonstration Forest, Pioneer Resources, Campbell Timber Management (Hawthorne Timber Company), and Weger Holdings own 83 percent of the watershed. Thirty-one property owners (ownership from 160 to 3,760 acres) own another 14 percent of the land, and the rest is in scattered private residences. Timber production and harvest are the primary land uses in the watershed. The history of the Big River watershed is dominated by timber harvest. Logging began in the basin about 1852. A mill was built, railroads were constructed and splash dams were used to transport logs down the river to the mill. Tractor yarding and road construction began in the 1940's with cable yarding staring in the 1970's. The entire watershed has been logged, some areas more than once. There is some grazing along Comptche-Ukiah Road and the southeast portion of watershed.

There is currently an effort to purchase portions (7,400 acres) of the Big River watershed for protection of the estuary and upland areas. Mendocino Land Trust is coordinating this effort. A total of $20 million is needed for the purchase. The State will provide $3 million, $7 million has been secured from the State Coastal Conservancy, $2 million are being provided by the Trust for Wildland Communities, $4 million in private pledges, $1 million is being provided by the U. S. Fish and Wildlife Service, and the National Fish and Wildlife Foundation along with the Marin Community Foundation are coordinating a private campaign to raise the remaining funds. The State Department of Parks and Recreation has agreed to incorporate the Big River property into the state park system.

IMPLEMENTATION STRATEGY

Strategy development will occur in the form of the TMDL waste load reduction strategy for sedimentation. The TMDL is tied to resource impacts and reduction of sources to reduce impacts and bring the watershed into a desired future condition that is consistent with the enhancement and maintenance of salmonid species. A broad interagency effort was used to gather and assess existing information on the watershed. Likewise, the development of the strategy will continue to incorporate significant interagency and public coordination.

Other concerns in the watershed will continue to be addressed through existing programs. Given current funding constraints, any new and/or redirected resources should be focused on staffing for field nonpoint source compliance and enforcement inspections.

Institutional framework

The *Water Quality Control Plan for the North Coast Region* (Basin Plan) contains specific water quality objectives and implementation programs to protect and enhance identified beneficial uses of water. The over-arching regulatory provisions of the Basin Plan are the Action Plan for Logging, Construction and Associated Activities and the Nonpoint Source Action Plan. The SWRCB and CDF/BOF entered into a Management Agency Agreement, which delegates primary water quality authority to the CDF/BOF associated with timber harvest regulation. However, the Regional Water Board has not given up any authority to regulate timber if violations of the Basin Plan occur or threaten to occur. Regulatory activities associated with timber harvest are conducted in accordance with that agreement.

ASSESSMENT AND PROBLEM IDENTIFICATION

The Big River watershed provides degraded conditions for salmonids because of poor quality summer rearing and overwintering habitat, which is limited by high sedimentation, low large woody debris (LWD), a low number of pools, the shallow depth of pools, channel entrenchment and a lack of connection to off-channel habitat. Spawning gravels generally are present, but their quality is low due to embeddedness of the gravels and fine sediment in the substrate. Low canopy cover and high water temperatures in some of the subwatersheds also serve to diminish the value of the habitat to salmonids. Available data are inadequate to quantify population trends of coho and steelhead in Big River watershed streams, however, regional data suggest that coho and steelhead have declined substantially this century. Historically, coho and steelhead are thought to have occurred throughout the Big River watershed in streams that are accessible to salmonids. Coho are present in some areas in the watershed, but the numbers and distribution is low. Steelhead are relatively more distributed and abundant, but, even so, the population is low compared to historic levels.

Sedimentation is a cause of habitat degradation in the Big River watershed. There are concerns about sedimentation on the estuarine processes in the Big River because timber harvesting within the valley has increased erosion on the slopes above the river. Subsequently, the sediment load of the river has increased, as most of the material eroded within the watershed is eventually transported to the river. Estuaries are subject to natural sedimentation with the coarser particles settling out upriver and the finer particles settling out in the estuary and floodplains along the lower reaches of the estuary. Sedimentation greatly accelerated after logging began, resulting in a major decrease in width and rapid sediment build-up along the banks in the lower river. The narrowing channel caused an increase in water velocity and increased deposition of fine sediment on the floodplains in the tidal areas. Levees built up at the edges of wetland flats where they adjoin the main channel are primary indicators of this rapid sediment accretion. These levees extend at least 3 kilometers (2 miles) further down the estuary than they did 80 years ago. There is concern about the effect of excessive sedimentation in the estuary on vegetation, because sediment-driven levee formation has cut off tidewater intrusion in and around the estuarine sloughs. The productivity of the estuary relies heavily on the production of salt marshes.

Sediment delivery to the river and tributaries has varied over time with the most delivery in the early periods of timber harvest when logging practices accounted for most of the sediment generation. But in recent times, since 1989, even though harvesting has increased (over 55 percent of the watershed has been harvested in the last two decades) and the quantity of roads has increased (over a third of the roads have been constructed in the last decade) total sediment generation did not increase over historical levels possibly due to improved road building and timber harvest practices. However, road

related sediment delivery has increased in total and proportionally to the total sediment generated, with 181 tons/sq. mile/year of sediment generated from roads including associated landslides. There is currently an estimated 1,242 miles of roads in the Big River watershed, which translates to a basinwide road density of 6.86 miles/sq.mile.

Other issues of concern in the watershed are potential herbicide runoff due to timberland management, livestock entry into watercourses, a rock quarry that is still active and adjacent to the main river, a permitted septic disposal facility adjacent to Lagoon Creek, a landfill near Casper, a small mill still in operation on Chamberlin Creek near the men's conservation camp, and the City of Mendocino that is sewered with an ocean outfall. There are some leaking underground fuel storage tank sites in the town of Mendocino and in the watershed itself. There is at least one incident of a fuel spill on Highway 20 into James Creek (a Big River tributary) which continues to contaminate the James Creek.

WATER QUALITY GOALS AND ACTIONS

The following listing represents a first-cut delineation of goals and actions to achieve the goals that will be refined through the TMDL development and a Watershed Team.

GOAL 1: Protect surface and ground water IND, MUN, DOM, REC-1, and REC-2 uses
GOAL 2: Protect and enhance beneficial uses associated with anadromous fishes COLD, MIGR, SPWN, EST, COMM

SUMMARY OF WATERSHED ACTIVITIES AND NEEDS

The overall emphasis in the WMA was the completion of the TMDL waste reduction strategy for sediment. Increased assessment activities and continued high priority forestry related activities, including any needed outreach to vineyards and ranches, are parts of that effort.

Assessment and Monitoring:

Assessment of existing information was used in the development of the TMDL strategy, drawing from existing information contained in plans being developed by the CDF and private timber companies as well as any citizen information that is made available. Data along with some analysis is available in the draft KRIS-Big computerized database package. A watershed assessment of the Big River is currently being drafted in a multi-agency effort led by the California Resources Agency called the North Coast Watershed Assessment Program (NCWAP). In total, five state agencies are participating NCWAP: Department of Fish and Game (DFG), Department of Forestry and Fire Protection (CDF), Department of Conservation-Division of Mines and Geology (DMG), Regional Water Quality Control Board – North Coast Region (NCRWQCB), and Department of Water Resources (DWR). As a result, the assessment will touch on each of the respective disciplines.

The principal goal of NCWAP is to compile and develop baseline scientific information about existing biophysical conditions in north coast watersheds. As part of this goal, extensive historical information will be compiled for the Big River watershed. The final product will include updates to a centrally located KRIS Big River database and a watershed assessment which will, among other things, provide a baseline of watershed conditions, help guide watershed restorations programs, and help landowners and agencies implement laws that require specific assessments such as the State Forest Practice Act and Federal Clean Water Act.

In-stream water quality and hillslope monitoring in the long term will be associated with determining the effectiveness of management practices to reduce erosion and sedimentation and determining trends towards the desired future in-stream condition. Three stations were monitored for basic water quality parameters as part of the Surface Water Ambient Monitoring Program (SWAMP) in fiscal

year 2000-2001. Presently, there are no plans to continue monitoring at these sites in fiscal year 2002-2003. Additional in-stream water quality monitoring will be needed associated with the TMDL.

Education and Outreach:
The watershed assessment being conducted under NCWAP and the TMDL process will enhance public and agency participation. Our intent is to improve the recognition of land use impacts on the aquatic environment from nonpoint sources and to foster adaptive management for overall watershed health.

Coordination:
We currently coordinate with local and State agencies on an as-needed basis. Improved coordination is sought as part of the TMDL implementation process and the NCWAP.

Core Regulatory:
The current level of point source regulation (inspection, monitoring, and enforcement) on traditional dischargers with some increase in storm water issues is anticipated. Construction related problems are addressed through the core regulatory program and the local oversight of individual systems.

Ground water:
Ground water issues center around petroleum contamination and mill sites and will continue to receive the current level of activity. Groundwater and surface water contamination is suspected at former and existing mill sites that historically used wood treatment chemicals. Discharges of pentachlorophenol, polychlorodibenzodioxins, and polychlorodibenzofurans likely occurred with poor containment typically used in historical wood treatment applications. These discharges persist in the environment and accumulate in surface water sediments and the food chain. Additional investigation, sampling and monitoring, and enforcement actions are warranted, but insufficient resources exist to address this historical toxic chemical problem.

Nonpoint Source:
Continued involvement in forestry, grazing and county road issues is necessary to ensure protection of aquatic resources. The recent listing of coho salmon as threatened under the federal Endangered Species Act has put the spotlight on all land use activities that potentially may increase sedimentation or otherwise affect habitat. The TMDL implementation process will increase work with local agencies and groups regarding land use effects on water quality, following the State Nonpoint Source Management Plan strategy of first emphasizing self-determined implementation of controls to reduce nonpoint source pollution. An outreach program will enhance the effectiveness of the program. Where land management activities are found to be out of compliance with Basin Plan standards, Regional Water Board staff investigation and enforcement actions may be determined necessary.

Timber Harvest
We have an extensive Timber Harvest program where staff review and inspect timber harvest plans for implementation of the Forest Practice Rules and best management practices to ensure protection of water quality and beneficial uses. We are expanding our program activities on private land in concert with California Department of Forestry and Fire Protection to achieve recovery of this impaired waterbody.

Local Contracts:
We will continue active involvement in the Clean Water Act sections 319(h) and 205(j) grant programs and the Water Bond (Proposition 13) grant program, as well as promoting other programs like the California Department of Fish and Game programs.

Water Quality Planning:
The Basin Plan review process feeds into the activities to the extent issues were identified in the Triennial Review and applicable to the Big River watershed. The top priority issue is the review the Nonpoint Source Control Measures

Additionally, the TMDL strategy will be incorporated into the Basin Plan at some future date.

Evaluation and feedback
We will evaluate progress on a yearly basis, the TMDL providing the focus.

BUDGET

We will attempt to fund the highest priority actions as identified in this WMA to the extent funding constraints allow, and will pursue additional funding to conduct outreach and enforcement activities as needed to pursue the actions we are currently unable to address.

Appendix D contains details on nonpoint source program activities and needs.

Appendix 2.3.6-A

Partial listing of agencies and groups with water quality jurisdiction and interests.

United States
- Environmental Protection Agency
- Fish and Wildlife Service
- National Marine Fisheries Service
- Natural Resources Conservation Service

California State
- California Environmental Protection Agency
- Department of Forestry and Fire Protection
- Board of Forestry
- Department of Fish and Game
- Department of Health Services
- Department of Toxic Substance Control
- Department of Water Resources
- California Coastal Conservancy
- Jackson State Demonstration Forest
- Montgomery Woods State Park

Mendocino County
- Water Agency
- Planning Department
- Department of Environmental Health

Local Agencies
- Mendocino County Resource Conservation District
- city planning departments
- city public works departments

Public Interest Groups and Industries
- Coast Action Group
- Pacific Coast Federation of Fishermen's Associations
- Georgia-Pacific Corporation
- Louisiana-Pacific Corporation
- Mendocino Redwood Company
- Campbell Timber Management
- Pioneer Resources
- Mendocino Land Trust
- Trust for Wildland Communities
- Friends of the Big River
- Big River Watershed Alliance